With all due respect, the examiner is understandably confusing the "extra virgin cold-pressed olive oil" used by Arora with the "unrefined olive kernel oil" composition taught and claimed by the applicant. It is understandable because the patent and biomedical literature, prior to applicant's present discoveries, was silent as to the use of olive kernels for any purpose other than biomass for energy generation processes or for animal feed. The state-of-the-art citations (which are not to be considered prior art, as this expression is defined in patent law) discussed below will make this clear.

In chapter 1 of the book "Olive By-Products For Animal Feed" (Exhibit 1), Fig. 1 shows a cross-section of an olive. For present purposes, one should concentrate on two of the regions of an olive. The first is the mesocarp (pulp or flesh) which constitutes up to about 80% of the weight of an olive, and the kernel (a.k.a. pit or stone) which constitutes up to about 5% of the weight of an olive.

As will be discussed in greater detail below, the extra virgin cold-pressed olive oil used by Arora comes from the pulp and is obtained by gently cold-pressing the pulp; the kernel is a discarded by-product. In sharp contrast, applicant's composition is obtained from the kernel, not the pulp, by a unique organic extraction process. Thus, Arora's composition is not at all analogous to the present composition.

Reference to applicant's present specification shows in paragraph [0016] that the souce of the oil compositions of the claimed invention is an organic extract of olive kernels. Further details of the production of the unrefined olive kernel oil can be found in paragraph [0020] of the specification of each of four devisional patent applications that were copending with the application under consideration at the time of allowance of all four ;these applications were USSN 10/329387, 10/329386 (now US 6,635,625), 10/329367 (now US 6,624,148) and 10/329366; a copy of US 6,624,148 (Exhibit 2) is enclosed for the examiner's

convenience (please refer to column 4, lines 14-45). As will be noted, the present examiner was thet examiner for all four of these derivative applications. The procedure consists of six steps, in brief: (1) compressing the olive to obtain the pulp (flesh) olive oils (such as used by Arora); (2) drying the water-washed kernel by-product; (3) extracting the kernels with an organic solvent (e.g., hexane) plus steam; (4) micro-filtering the organic extract; (5) evaporating the organic solvent with a stream of an inert gas; and (6) storing the residue in sealed containers to avoid air-oxidation. It is this residue that is used in the present inventive compositions to exploit its unique pharmaceutical characteristics. Applicant is the first to recognize the use of kernel extracts for medical purposes.

Maisch, *Amer J Pharm* 56: 923 (1884) (Exhibit 3) describes on pp 2 and 3 the making of olive oil. Note particularly that the olive oil commonly used in commerce is produced by compressing the olive pulp; the kernel by-product is discarded or used as fuel. This process is also described in "Olea Europaea" from the Animal Feed Resources Information Sytem (Exhibit 4).

Please note also an article by Herbst in Barron's Educational Series, from the New Food Lover's Companion, 2nd ed. (1995) (Exhibit 5) that defines the classes of commercial olive oil, such as that used by Arora. Extra virgin olive oil is said to be the cold-pressed result of the first pressing of the pulp or flesh of olives. Virgin olive oil is also a first pressing , but has a higher level of acidity. Other lower grade classes are also described. <u>None of these contain components of olive kernels.</u>

In an article on agricultural residues published in 1995 by the European Network to Coordinate Information Exchange between National Biomass Programmes (Exhibit 6), olive kernels are listed as a dry agricultural residue, teaching away from any medical use of these kernels.

In a May 1999 article appearing in the California Oilive Oil News (Exhibit 7), the author mphasizes the desirability of obtaining olive oil by processes that do not break the pit, as the pit contains compounds, *e.g.*, enzymes, that can impart a bitter taste to the oil. This again emphasizes that the extra virgin olive oil used by Arora did not contain kernel products.

Olive oil for "soothing and healing" the skin (as used by Arora) is described as being made from the pulp and not the kernel (Exhibit 8, from Esential Oils (Pty) Ltd.). Parenthetically, this teaching could have been, but apparently was not, cited as close prior art during the prosecution of the Arora patent application.

The applicant submits that this summary of the state of the art demonstrates clearly that the pulp or flesh olive oil taught by Arora bears no relationship to the organic extract of olive kernels taught and claimed in the present patent application. As Arora is non-analogous art, it cannot be combined with Murad to reach the present claims.These rejections should be withdrawn.

Claim 22 is rejected under 35 USC 103(a) as being unpatentable over Murad (US 5,804,594) and Arora (US 5,233,257) in view of Florio (US 6,136,795). The examiner asserts that Murad's failure to teach the use of its composition for inflammation is cured by Florio's teaching of nutritional supplements containing chondroitin sulfate and glucosamine sulfate for symptomatic relief of arthritis.

In view of the unequivocal evidence shown above that establishes that Arora cannot be combined with Murad to reach any claim, Florio has no weight. Therefore, applicant submits that this rejection must also fail, and should be withdrawn.

The examiner is respectfully urged to withdraw all rejections and to pass

this application to allowance and issue. The examiner is also urged to contact the undersigned prior to any further action if any questions remain.

Respectfully submitted,

Date: 10/22/2003

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CHAPTER I: IMPORTANCE OF OLIVE PRODUCTION AND OLIVE TREE BY-PRODUCTS

1.1 Olive production

Although olive tree production is distributed over all five continents (see Table 1), it prevails especially in the Mediterranean Basin which represents 98 percent of the production area and trees and 97 percent of all olive production.

The four countries (Spain, Greece, Italy and Tunisia) examined in this study represent by themselves:

- 65 percent of the area
- 76 percent of the trees in production
- 74 percent of total olive production

On a world scale the importance of olive production can be summed up by the following four figures (rounded out):

Table 2: Size of world olive production

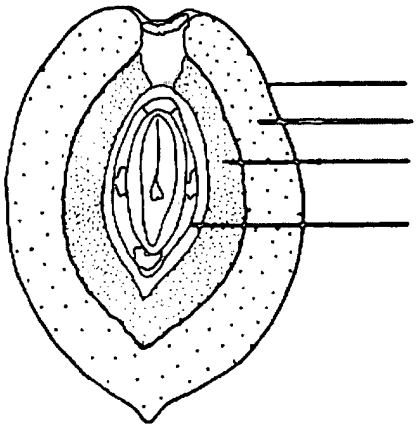
- total area	:	7 000 000 ha
- trees in production	:	600 000 000
- olives produced	:	8 400 000 tons
- oil produced	:	1 600 000 tons

Olive cultivation has a social character, since it employs abundant labour and involves many small producers. On the other hand, production is seasonal which has repercussions on job conditions and the availability of by-products.

1.2 Olive composition

The olive is a drupe; its physical composition is shown in Fig. 1

Figure 1: The olive: (a) cross-section and (b) physical composition



	dryweight %
epicarp	2,0 to 2,5
mesocarp (= pulp)	71,5 to 80,5
endocarp (= stone wall)	17,3 to 23,0
kernel	2,0 to 5,5

a) from Maymone et al, 1961
b) Nefzaoui, 1983

Table 1: Importance of olive production in the main producer countries

Country	Plantations (1)			Production (2)	
	Area (1 000 ha)	Plants in production (x 1 000)	Density (plants/ha)	Olives (1 000 T)	Oil (1 000 T)
Europe					
Albania	20	1 500	75	53	7
France	30	3 800	130	16	2
Greece	420	79 000	190	1 350	280
Italy	1 200	160 000	133	2 800	566
Portugal	480	26 000	54	220	33
Spain	2 300	180 000	78	1 348	281
Yugoslavia	60	4 700	78	13	2
Africa					
Algeria	125	10 000	80	100	11
Egypt	2	100	50	6	0.5
Libya	154	4 000	26	162	16
Morocco	140	6 700	48	350	38
Tunisia	600	37 000	62	700	140
Asia					
Turkey	1 200	59 000	49	650	107

Other	137	14 000	102	395	68
America	122	12 800	105	214	29.7
Australia	-	40	-	6	0.6
TOTAL	6 990	598 740	86	8 383	1 581.8

Sources:
(1) From Fertimont, "Mondo Economico" No. 3, 23 January 1983
(2) From FAO: Statistics Series No. 40, 1982

1.3 Oil manufacture

The technology used is very varied and has been modified considerably during recent decades. As an example, two methods are described below:

- extraction by pressure: Tunisia (Fig. 2)
- extraction by centrifugation: Italy (Fig. 3)

and the percentages of oil and by-products obtained (olive cakes and vegetation waters) are given.

There are also other procedures such as the Acapulco method which consists of previously separating the stone from the pulp.

1.4 Main by-products

1.4.1 Definitions

It is important to define the different by-products since there is some confusion in the publications which makes it sometimes difficult to identify clearly the particular by-products concerned. The following definitions are therefore given:

a. Oil extraction by-products

- crude olive cake: The residue of the first extraction of oil from the whole olive by pressure. Its relatively high water (24%) and oil (9%) content cause rapid spoilage when it is exposed to air.
- exhausted olive cake: The residue obtained after extraction of the oil from the crude olive cake by a solvent, usually hexane.

- partly destoned olive cake: The result of partly separating the stone from the pulp by screening or ventilation:
- it is called "fatty" if the oil has not been solvent-extracted.
- it is called "exhausted" or "defatted" if the oil has been solvent-extracted.
- olive pulp: The paste obtained when the stone has been separated from the pulp before extraction of the oil. It has a high water content (60%) and is difficult to store.
- vegetation waters: The brown watery liquid residue which has been separated from the oil by centrifugation or sedimentation after pressing (Fedeli and Camurati, 1981).
- leaves collected at the oil mill: These are not pruning residues, but the leaves obtained after the olives have been washed and cleaned on entering the oil mill. In Greece their estimated quantity is about 5 percent of the weight of the olives (Zoiopoulos, 1983).

b. Pruning and harvest residues

Olive trees are usually subjected to severe pruning every second year and light pruning in the alternate year. After separation of the large branches, the leaves and twigs (less than 3 cm in diameter) can be distributed to ruminants.

1.4.2 Estimated quantities of olive by-products

The quantities can vary according to the manufacturing process. Average estimated values are summarized in Figure 4. Taking 35 percent as the average value for proportion of crude olive cake to processed olives, world crude olive cake production can be estimated at about 2 900 000 tons.

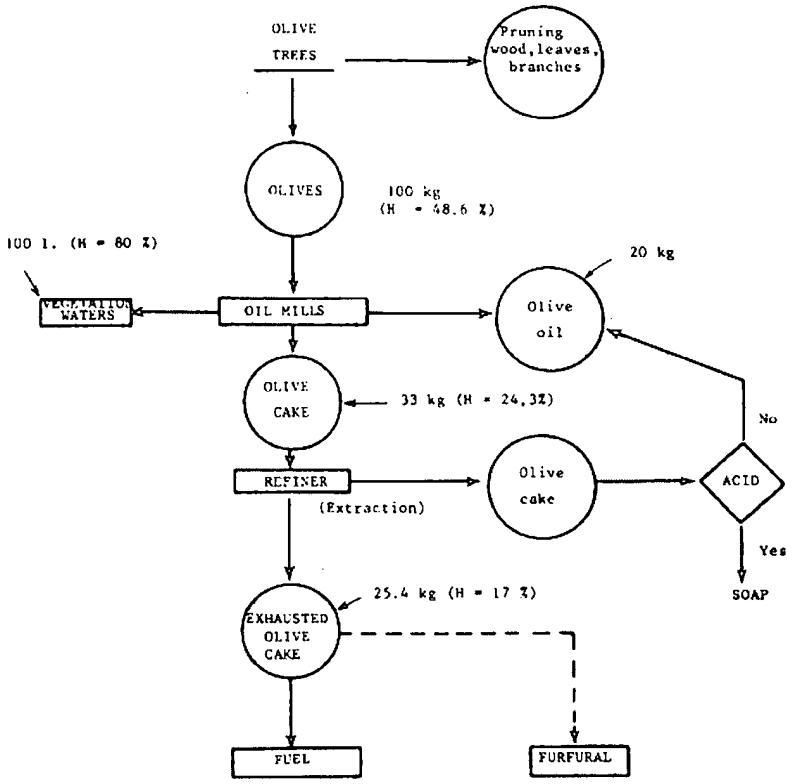


Figure 2. Diagram of the present olive oil industry in Tunisia

Source: Nefzaoui, 1983

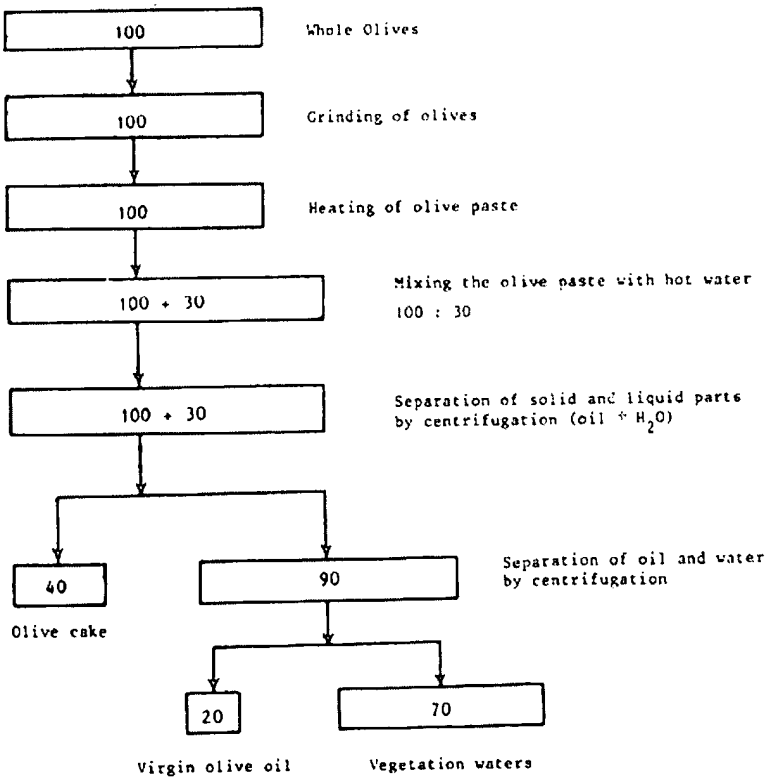


Figure 3. Pieralisi oil extraction mill in lazio (Italy): olive processing by centrifugal separation

Source: Martilotti, 1983

Figure 4: Method of obtaining different types of olive cake and physical composition (Feretti method)

Method	Ratio	By-products	Physical Composition %
	100 kg	OLIVE	water : 48.6
			oil : 27
Pressing			dried stones : 14.1
			kernels : 1.3
			mesocarp+
			epicarp : 9
	33 kg(1)	CRUDE OLIVE CAKE	water : 24,3
	(33%)		oil : 9.1
Solvent extraction			dried stones : 42.4
			kernels : 3
	16.7 kg (2)	SCREENED OLIVE CAKE	water : 37.7
	(50.5%)		oil : 16.8
Screening-Ventilation			dried stones : 5.6
			dried kernels : 5.6
			mesocarp +
			epicarp : 39.9
	7.41(3)	EXHAUSTED SCREENED	water : 4.5
	(44%)	OLIVE CAKE	
			oil : 4.2
			dried stones : -
			dried kernels : 11.1
			mesocarp +
			epicarp : 80.2

Source: Adapted from Feretti and Scalabre, 1978
(1) Part of the mesocarp and the epicarp are lost in vegetation waters.
(2) Screening losses as dust, about 5 percent.
(3) On emerging from extraction olive cake contains about 17 percent water and is dehydra-ted again.

N.B. When crude olive cake is defatted without being destoned, the exhausted olive cake then represents about 77 percent of crude olive cake and has the following composition: water, 15%; oil, 4%; shells, 55%, pulp, 26%.

Source: Office National de l'Huile (National Oil Bureau), Tunisia.

The percentage of crude olive cake treated by solvents to extract the oil from the cake varies widely according to the country, reaching 80 percent in Greece and Tunisia. There is a marked tendency to increase the quantity of olive cake subjected to oil extraction by solvents.

Exhausted olive cake partly destoned by screening or ventilation is not widespread at present. After destoning, it represents about 44 percent of the original exhausted olive cake. Several studies have been undertaken for its valorization, especially in Tunisia, but have not been developed on an industrial scale.

The vegetation waters eliminated constitute a large quantity of polluting effluents and most countries are now concerned by this pollution problem. In pressure extraction methods about 100 litres of vegetation water are obtained per 100 kg of olives processed.

Concerning olive tree leaves and twigs, Nefzaoui (1983) made the following estimates of quantities produced (Table 3):

Table 3: Quantities of wood, leaves and twigs obtained according to age of olive tree and type of pruning

Age of tree	Pruning type	Total quantity of wood kg/tree	Leaves and twigs %	Quantity of leaves and twigs kg/tree
young	light	-	-	-
	severe	30	60	18
adult	light	50	50	25
	severe	100	30	30
	light	-	-	-

old	severe	100	12	12

Recent research by Vera y Vega and Galan Redondo (1978), Civantos (1981 b and 1982) and Parellada et al (1982) have attemped to estimate olive tree branch and leaf production in different conditions in Spain. Yields vary widely from 10 to 25 kg and can reach as much as 45 kg for olive trees in favourable cultivation conditions. Weighted average per tree is probably about 22 kg of twigs according to Parellada and Gomez-Cabrera (1983). These estimates agree on the whole with those of Nefzaoui (see Table 3).

US006624148B2

United States Patent
Theoharides

(10) Patent No.: US 6,624,148 B2
(45) Date of Patent: *Sep. 23, 2003

(54) **PROTEOGLYCAN COMPOSITIONS FOR TREATMENT OF CARDIOVASCULAR INFLAMMATORY DISEASES**

(76) Inventor: **Theoharis C. Theoharides**, 14 Parkman St., Brookline, MA (US) 02446

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

This patent is subject to a terminal disclaimer.

(21) Appl. No.: **10/329,367**

(22) Filed: **Dec. 27, 2002**

(65) **Prior Publication Data**

US 2003/0104088 A1 Jun. 5, 2003

Related U.S. Application Data

(63) Continuation of application No. PCT/US02/00476, filed on Jan. 3, 2002, and a continuation of application No. 09/771,669, filed on Jan. 30, 2001.

(51) **Int. Cl.**[7] **A01N 43/04**; A61K 31/70

(52) **U.S. Cl.** **514/27**; 424/400; 424/78.02; 424/78.03; 424/451; 424/464; 424/45; 514/54; 514/55; 514/62

(58) **Field of Search** 424/400, 401, 424/78.02, 78.03, 78.05, 451, 464, 45; 514/2, 54, 55, 62

(56) **References Cited**

U.S. PATENT DOCUMENTS

5,804,594 A * 9/1998 Murad 514/474
6,136,795 A * 10/2000 Florio 514/62

FOREIGN PATENT DOCUMENTS

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* cited by examiner

Primary Examiner—Thurman K. Page
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(74) *Attorney, Agent, or Firm*—Law Offices of Dr. Melvin Bleecher; Melvin Bleecher

(57) **ABSTRACT**

Compositions with synergistic anti-inflammatory effects in inflammatory diseases resulting from activation and consequent degranulation of mast cells and followed by secretion of inflammatory biomolecules from the activated mast cells, composed of a heavily sulfated, non-bovine proteoglycan such as shark cartilage chondroitin sulfate C, and one or more of a hexosamine sulfate such as D-glucosamine sulfate, a flavone such as quercetin, an unrefined olive kernel extract that increases absorption of these compositions in various routes of administration, S-adenosylmethionine, a histamine-1 receptor antagonist, a histamine-3 receptor agonist, an antagonist of the actions of CRH, caffeine, and a polyamine.

1 Claim; No Drawings

PROTEOGLYCAN COMPOSITIONS FOR TREATMENT OF CARDIOVASCULAR INFLAMMATORY DISEASES

This application is a continuation of international application No. PCT/US02/00476, filed Jan. 3, 2002 pending U.S. Ser. No. 09/771,669, filed Jan. 30, 2001.

BACKGROUND OF THE INVENTION

The invention is generally related to the treatment of inflammatory conditions. More specifically, the invention is related to compositions containing inhibitors of mast cell activation and secretion such as a proteoglycan that are designed to be used as dietary supplements or adjuvants to conventional approved medications for the relief of inflammatory conditions.

There have been a number of mostly anecdotal reports that the proteoglycan chondroitin sulfate, as well as glucosamine sulfate, a product of the intestinal breakdown of proteoglycans, may be helpful in relieving the pain of osteoarthritis:—Shute N. Aching for an arthritis cure. *US News and World Report*, Feb. 10, 1997.—Cowley G. The arthritis cure? *Newsweek*, Feb. 17, 1997; Foreman J., People, and their pets, tout arthritis remedy. *The Boston Globe*, Apr. 7, 1997; Tye L. Treatment gains scientific attention. *The Boston Globe*, Sep. 25, 2000.

A recent meta-analysis showed potential therapeutic benefit of chondroitin sulfate and/or glucosamine in osteoarthritis [McAlindon et al. *J Am Med Assn.* 283:1469 (2000)], while a double-blind clinical trial with glucosamine showed definite benefits in osteoarthritis with respect to both pain and radiographic joint appearance [Reginster et al., *Lancet* 337:252 (2001)]. However, less than 5% of the chondroitin sulfate in commercially available preparations is absorbed orally, because the size of the molecule and the degree of sulfation impede its absorption from the gastrointestinal tract. Furthermore, such commercial preparations use chondroitin sulfate obtained from cow trachea, with the possible danger of contracting spongiform encephalopathy or "mad cow disease". In fact, the European Union has banned even cosmetics that contain bovine-derived products.

Theoharides et al. *British Journal of Pharmacology* 131:1039 (2000) indicated for the first time how proteoglycans such as chondroitin sulfate may work. The paper reported that chondroitin sulfate and, to a lesser degree, glucosamine sulfate, inhibit activation of mast cells that are known to trigger allergy and asthma. This discovery is the basis for Theoharides, U.S. patent applications, Ser. No. 09/056,707, filed Apr. 8, 1998 and 09/773,576, filed Feb. 2, 2001.

Mast cells are also now recognized as important causative intermediary in many painful inflammatory conditions [Galli, *N Eng J Med.* 328:257 (1993); Theoharides, *Int J Tissue Reactions* 18:1 (1996)], such as interstitial cystitis and irritable bowel syndrome [Theoharides, *Ann NY Acad. Sci.* 840:619 (1998)], as well as in migraines and possibly multiple sclerosis [Theoharides, *Persp Biol Med.* 26:672 (1983); Theoharides, Life Sci 46:607 (1996)]. In fact, glucosamine was recently considered to be prophylactic for migraines [Russell, *Med Hypoth* 55:195 (2000)].

Mast cells are increasingly implicated in conditions involving inflamed joints, such as in osteoarthritis and rheumatoid arthritis, through activation of local mast cells by, for example, neuropeptides, such as Substance P. Additional indirect evidence also supports the involvement of mast cells in bone resorption: (a) systemic mastocytosis is

invariably associated with osteoporosis; (b) inhibition of mast cell mediator release reversed lytic bone changes; (c) depletion of mast cells inhibited bone resorption in organ culture; (d) human synovial mast cells were shown to secrete in response to allergic and non-immunologic stimuli; (e) human mast cells release the cytokine IL-6 and (f) IL-6 has been definitively linked to bone resorption and osteoporosis.

It was recently shown that chondroitin sulfate's ability to inhibit the activation of mast cells compliments the inhibitory effects on mast cell activation of another class of naturally occurring compounds, the flavonoids [Middleton et al. *Pharm Rev* 52:1 (2000)]. Certain plant flavones (in citrus fruit pulp, seeds, sea weed) are now recognized as anti-allergic, anti-inflammatory, anti-oxidant and cytoprotective with possible anti-cancer properties. Only some flavonoids that belong to the subclass of flavones, e.g., quercetin, inhibit mast cell activation.

Quercetin inhibits secretion from human activated mast cells [Kimata et al. *Allergy* 30:501(2000)], and has also been used effectively for the treatment of chronic prostatitis [Shoskes et al., *Urology* 54:960 (1999)]. However, other flavonoids may have opposite effects. Use of the term "bioflavonoids" or "citrus flavonoids" in certain commercial products, therefore, provides little information, and may include molecules that have detrimental effects; for example, soy contains isoflavones that have estrogen-like activity that worsens inflammatory conditions.

Copending U.S. patent applications Ser. Nos. 09/056,707, filed Apr. 8, 1988, and divisional 09/773,576 claim the oral use of proteoglycans, without and with flavonoids, for the treatment of mast cell activation-induced diseases. Absorption of these compositions from the gastrointestinal tract and synergism with other treatment modalities were not addressed in these applications.

Applicant has described the use of antagonists of the action of Corticotropin Releasing Hormone (also known as Corticotropin Releasing Factor) in inhibiting myocardial mast cell activation in myocardial ischemia (copending U.S. patent application Ser. No. 08/858,136, filed Mar. 18, 1997), in treating stress-induced skin disease (U.S. Pat. No. 6,020,305) and stress-induced migraine headaches (U.S. Pat. No. 5,855,884), the contents of which are incorporated herein by reference. The synergistic effects of the compositions of the present invention that include antagonists of the actions of Corticotropin Releasing Hormone ("CRH") on mast cells were not recognized at the time of the previous studies. The word "antagonists" in connection with CRH is intended herein to include any molecule that prevents the actions of CRH on target cells, and includes, but is not limited to, anti-CRH neutralizing antibodies or binding proteins, or molecules preventing the release of CRH at local sites (see below for details).

Applicant has also described a method for treating patients with mast cell derived molecules-induced interstitial cystitis with histamine-1 receptor antagonists (U.S. Pat. No. 5,994,357). Treatment of mast cell molecules-induced migraines with histamine-1 receptor antagonists is the subject of Theoharides U.S. Pat. No. 5,855,884. Histamine-3 receptor agonists as pharmaceutical agents in mast cell-involved diseases are described in Theoharides U.S. Pat. No. 5,831,259. The contents of these three patents are incorporated herein by reference. At the time of this invention the synergistic effects of the present compositions with such antagonists had not yet been recognized.

An important need therefore exists for compositions for administration to human patients being treated for mast

cell-induced inflammatory diseases by various modalities, that are synergistic in that they have stronger effects than the sum of the effects of the individual components, and also synergistic with conventional clinical treatments of inflammatory conditions. "Synergistic" is also intended to mean: "coordinated or correlated action by two or more structures or drugs" [Stedman's Medical Dictionary, 23rd edition, Williams & Wilkins, Baltimore, 1976]. An important need also exists for formulations that increase the absorption from the gastrointestinal tract, nasal passages and skin surface of the compositions of the invention. Such formulations have been discovered, and are described below.

SUMMARY OF THE INVENTION

The invention comprises compositions for human use containing a sulfated proteoglycan and an unrefined olive kernel (seed) oil, and one or more active ingredients selected from the group consisting of a sulfated hexosamine, a flavonoid compound, S-adenosylmethionine ("SAM"), histamine-1 receptor antagonists, histamine-3 receptor agonists, antagonists of the actions of CRH, caffeine, folic acid, rutin, polyunsaturated fatty acids, and polyamines, together with appropriate excipients and carriers, said compositions having improved absorption from the gastrointestinal tract, skin surface, and-nasal and pulmonary surfaces, and anti-inflammatory effects synergistic with each other and synergistic with available conventional clinical treatment modalities.

In one embodiment, the sulfated glucosamine is D-glucosamine sulfate, the proteoglycan is non-bovine chondroitin sulfate, and the flavone is quercetin.

In an other embodiment, compositions may also contain antagonists of the effects of CRH on mast cells or other target cells of the myocardium, gastric mucosa, urinary bladder, skin, meningeal membranes, and blood-brain barrier.

In still another embodiment, the present compositions are used against superficial vasodilator flush syndromes.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS OF THE INVENTION

It has been discovered that a combination of a sulfated proteoglycan, a sulfated D-hexoseamine and a flavone in a unique, unrefined olive kernel extract, with optional CRH antagonists, histamine-1 receptor antagonists, histamine-3 receptor agonists, polyamines and caffeine has synergistic anti-inflammatory effects when used as a dietary supplement, a topical product or an aerosol for nasal or pulmonary administration, without or with a conventional clinical treatment for inflammatory diseases. Such inflammatory diseases result from the activation, degranulation and consequent secretion of inflammatory biochemicals, from mast cells, and the resultant inflammatory diseases include the group consisting of: allergic inflammation, arthritis (to include osteoarthritis and rheumatoid arthritis), cancer, fibromyalgia, inflammatory bowel disease, interstitial cystitis, irritable bowel syndrome, migraines, angina, chronic prostatitis, eczema, multiple sclerosis, psoriasis, sun burn, periodontal disease of the gums, superficial vasodilator (flush} syndromes and hormonally-dependent cancers.

In a highly preferred embodiment, the sulfated proteoglycan is non-bovine chondroitin sulfate, preferably from shark cartilage, which blocks mast cell activation, degranulation and consequent secretion of inflammatory biochemicals from the mast cells. Other natural sulfated proteoglycans suitable for practicing this invention include keratan sulfate, dermatan sulfate and hyaluronic acid sodium salt (sodium hyaluronate). A preferred biological source of the chondroitin sulfate is shark cartilage which is more-highly sulfated than the common commercial chondroitin sulfate isolated from cow trachea; the shark cartilage source also avoids the potential dangers associated with bovine sources.

The highly preferred flavone is quercetin which inhibits secretion of inflammatory molecules from mast cells by affecting moesin, a unique 78 kDa mast cell protein [Theoharides et al. *J Pharm Exp Therap* 294:810 (2000)]. In addition to quercetin, other flavones suitable in carrying out the invention include myricetin, genistein, kaempferol and the quercetin glycoside rutin. A highly preferred source of quercetin and its glycoside is the Saphotia plant.

The olive kernel (pit) extract component of the inventive compositions is preferably an unrefined (first pressing, filtered, oleic acid-related acidity <1%, water content <5%) oil produced, for one source, on the island of Crete in Greece. This kernel oil is especially prepared by the maker by a process consisting essentially of: (1) washing the kernel mass that remains after the compression of the oil from the olive flesh with water (Sansa); (2) drying the washed kernels in a stream of hot air at about 80 degrees C. to reduce the humidity to about 1%; (3) extracting the dried kernels with hexane and steam; (4) cooling the hexane extract, microfiltering the extract (5 micron pore size) to remove particulate matter; (5) heating the hexane extract at about 40 degrees C. degrees while percolating helium (to avoid oxidation) through the fluid to evaporate the hexane (final <0.5%), which process reduces the water content to <1% and the acidity (as oleic acid) to <3%; and (6) storing the extract in sealed containers. This olive kernel extract surprisingly has the unique property of increasing absorption of the other components of the anti-inflammatory compositions through the intestinal mucosa and skin, and also adds its own content of important anti-oxidants [Bosku, *World Rev Nutr Diet*, 87:56 (2000)], such as omega fatty acids (e.g., eicosapentanoic acid) and alpha tocopherol. Although not claimed herein, it has been claimed that kernel olive extract has cytoprotective, longevity-producing effects [Trichopoulou et al. *Am J Clin Nutr* 61:1346S (1995); Trichopoulou et al, *Cancer Epid Biomarker Prevention* 9:869 (2000)]. The polyphenols in such olive oil also have anti-inflammatory effects in, for example, arthritis [Martinez-Dominguez et al., *Inflamm. Res.* 50:102 (2001)]. A preferred source of the unrefined olive kernel extract of the invention is: E.B.E.K., Inc., Commercial, Industrial Enterprises of Crete, 118 Ethnikis Antistasecos, Heraklion, Crete, 71306, Greece.

Supplementation of the compositions described above with the methylation reagent S-adenosylmethionine ("SAM") adds antioxidant, anti-inflammatory and cytoprotective properties, particularly in inflammatory joint diseases. Addition of SAM also accelerates metabolism of homocysteine, which amino acid has been implicated in coronary disease, to cysteine, which is harmless. Folic acid may be added to certain of the present formulations for similar reasons.

Another supplement to the basic compositions of the invention is a histamine-1 receptor antagonist, such as diphenhydramine, hydroxyzine, azelastine, azatadine and cyproheptadine. Other histamine-1 receptor antagonists are described in Table 25-1 in Goodman and Gilman's The Pharmaceutical Basis of Therapeutics, 9th ed., New York, 1996. Histamine-3 receptor agonists are described in the Theoharides patents listed above.

Inhibitors of mast cell activation and secretion may be used in the treatment of inflammatory processes such as superficial vasodilator syndrome, e.g., menopausal-associated flush, monosodium glutamate-associated flush, carcinoid flush and niacin-associated flush.

Sources of CRH antagonists include, in addition to the Theoharides patents listed in the Background section above: Neurocrine Biochem. Inc.'s D-Phe 12 Nle Ala32,21, 38hCRH(1241)NH2, cat no. 1P-36-41; Pfizer non-peptide CP-154,526-1; Sigma Chem., St. Louis anti-CRH polyclonal antiserum; and Pfizer, NY patents and applications: U.S. Pat. No. 6,211,195, U.S. Pat. No. 5,795,905, PCT/IB95/00573, PCTJIB95/00439, U.S. Ser. No. 08/448,539, U.S. Ser. No. 08/481,413, U.S. Ser. No. 09/735,841, and in Owens et al. *Pharm. Rev.* 43:425 (1991).

The preferred concentration range of the proteoglycan, hexosamine sulfate and flavone components of the oral formulations are 10–3,000 mg per tablet or capsule. The preferred concentration range for SAM is 3–1,000 mg per capsule or tablet. Generally, where present, the amounts of the unrefined kernel oil are at least three times those of the other active ingredients, preferably 900–1200 mg. The number of capsules or tablets to be taken per day is determined by the nature and severity of the medical condition, and is readily determinable by the patient's health provider. Other representative formulations are described in the examples below.

The compositions of the invention may be formulated in any standard means of introducing pharmaceuticals into a patient, e.g., by means of tablets or capsules. The compositions of the invention include ointments and creams for skin conditions, mouth washes and toothpaste for periodontal diseases, and solutions for nasal aerosols. Standard excipients and carriers for the active ingredients of the inventive compositions are described in Remington's Pharmaceutical Sciences, Mack Publishing Co., Easton, Pa. Fragrances and flavorings may also be added.

Although not bound by any particular mechanism of action of the components of the claimed compositions, the inventor contemplates that the proteoglycan inhibits the activation and degranulation of the relevant mast cells, while the flavone inhibits the secretion of inflammatory biomolecules from these mast cells. "Activation" and "degranulation" of mast cells are defined herein as is standard and well known in this art, that is, to mean secretion from the activated mast cell of any type of molecule(s) that alone or in combination triggers inflammatory processes.

EXAMPLES

Example 1

Table 1 compares chondroitin sulfate-containing commercial products to the present compositions.

TABLE 1

Comparison of Chondroitin Sulfate-Containing Products to Present Invention

Product	Most Available Compositions	Present Invention
Main ingredient	Mixture of chondroitins	Non-bovine chondroitin sulfate, preferably the C type
Source	Cow trachea	Shark cartilage
Amount per capsule or tablet	100–300	10–3000 mg
Degree of sulfation	Low, if any	High
Absorption from g.i. tract	<5%	>15%
Target	Unknown	Mast cells, inflammatory cells
Other ingredients	Vitamins, fish oils (some preparations)	Flavones, unrefined kernel olive oil, SAM, histamine-1 receptor antagonists, histamine-3 receptor agonists, CRH antagonists, polyamines, caffeine, folic acid
Advantages	None known	Anti-allergic, anti-inflammatory, anti-oxidant, cytoprotective
Adverse effects	Risk of mad cow disease, spongiform encephalopathy, stomach upset, allergy to fish products	None known
Relevant conditions	Osteoarthritis	Allergic inflammation angina, asthma coronary artery disease, arthritis (osteoarthritis or rheumatoid arthritis), chronic prostatitis, eczema, fibromyalgia, interstitial cystitis, irritable bowel syndrome, inflammatory bowel disease, migraines, multiple sclerosis, psoriasis, periodontal disease, flush syndrome, cancer (including hormonally-dependent forms),
Scientific publications	None found	Theoharides et al. Br J Pharm 131:1039 (2000) Middleton et al. Pharm Rev 52:673 (2000)

In all examples, chondroitin sulfate is to assumed to be of a non-bovine variety.

Example 2

Composition For Protecting Against Inflammatory Diseases

Two capsules to be taken orally 2–3 times daily, at least one hour before meals

Ingredients, per capsule,	mg:
Chondroitin sulfate	150–300
D-Glucosamine sulfate	150–300
Quercetin	150–300
Unrefined olive kernel extract	900–1200

Example 3

Composition For Protecting Against Arthritis

Ingredients per capsule,	mg:
D-Glucosamine sulfate	150–300
Chondroitin sulfate	150–300
Sodium hyaluronate	100–200
Quercetin	150–300
Unrefined olive kernel extract	900–1200

Example 4

Topical Composition For Protecting Against Arthritis
Skin ointment or cream. Apply three times per day to affected areas.

Ingredients	% by weight
D-glucosamine sulfate	5
Chondroitin sulfate	5
Sodium hyaluronate	5
Bitter willow bark extract	5
Quercetin	3
Unrefined olive kernel extract	15

Example 5

Composition For Protecting Against Cardiovascular Disease
Two capsules to be taken orally 2–3 times per day, in mg:

Chondroitin sulfate	50
Kaempferol	100
S-adenosylmethionine	50
Niacin	100
Unrefined olive kernel extract	900–1200
Bitter willow bark extract, 5% by weight	

Example 6

Composition For Protecting Against Periodontal Disease

Mouthwash:	
Chondroitin sulfate	0.4M
Quercetin	0.4M
In a standard mouthwash vehicle	

Example 7

Toothpaste Composition

Toothpaste,	mg %:
Chondroitin sulfate	5
Quercetin	3
Optionally, D-glucosamine sulfate	5
In a standard toothpaste vehicle	

Example 8

Sunscreen composition

Ingredients	mg %
Chondroitin sulfate	5
D-glucosamine sulfate	5
Quercetin	3
Sun screen (e.g., TiO_2)	5

Example 9

Composition For Protecting Against Migraine Headaches

Ingredients,	mg:
Chondroitin sulfate	50
Quercetin	100
Azatadine	4
Optionally, a CRH-receptor antagonist	

Example 10

Composition For Protecting Against Relapsing Multiple Sclerosis

Ingredients,	mg:
Chondroitin sulfate	50
Quercetin	400
Hydroxyzine	50
Optionally, interferon-beta	

Example 11

Composition For Protecting Against Cystitis And Prostatitis

Ingredients,	mg:
D-glucosamine sulfate	50
Chondroitin sulfate	100–300
Sodium hyaluronate	200
Quercetin	100–400
Unrefined olive kernel extract	900–1200

Example 12

Composition For Protecting Against "Flush"

Ingredients, per capsule:	
Chondroitin sulfate	50 mg
Quercetin	150 mg
Bitter willow bark extract	5% by weight
Optionally, cyproheptadine or azatadine	4 mg

Example 13

Cream Composition For Protecting Against Skin Allergy

Ingredients:	% by weight
Aloe vera	5
Non-bovine chondroitin sulfate	5
Myricetin	5
Alpha-tocopherol 1	5
Unrefined olive kernel extract	15
Optionally, azelastine or hydroxyzine	5

Example 14

Composition For Protecting Against Allergy and Allergic Asthma	
Ingredients.	mg
Myricetin	500
Chondroitin sulfate	200
Optionally. azelastine or hydroxyzine	

Example 15

Composition For Protecting Against Hormonally-Dependent Cancers	
Ingredients.	mg
Quercetin	150
Genestein	50
Optionally. tomoxifen or raloxifen	10

Example 16

Composition For Protecting Against Allergic Conjunctivitis	
Ingredients:	
Quercetin	0.05%
Chondroitin sulfate	2.0%
Optionally. azelastine	0.05%

I claim:

1. A composition for oral use with synergistic anti-inflammatory properties in cardiovascular conditions induced by the activation of mast cells, consequent degranulation of said cells and subsequently secretion of inflammatory biomolecules, comprising: shark cartilage chondroitin sulfate, 50 mg; Saphora plant rutin (quercetin glycoside) 100 mg; S-adenosylmethionine. 200 mg; folic acid, 70 μg; fish body oil eicosapentanoic acid, 20%; microfiltered unrefined olive kernel (pit) extract (acidity less than 3% and water less than 5%), 29%; suspending agents 40 mg beeswax and 20 mg lecithin; in soft gel (from pig gelatin) capsules.

* * * * *

American Journal of Pharmacy.

Editor: John M. Maisch, M.D. - Vol. 56, 1884.

Olive Oil and its Production.

Other tomes: King's

The following particulars with regard to the production of olive oil in Tuscany have been furnished to Mr. Consul Inglis by one of the principal exporters in Leghorn:

The olive oil produced in Tuscany from the first pressing of the fruit is intended for consumption as an article of food. Hence, great attention is paid both to the culture of the olive tree and the process of making oil.

The olive crop is subject to many vicissitudes, and is an uncertain one. It may be taken as a rule that a good crop does not occur more frequently than once in three years. A prolonged drought in summer may cause the greater part of the small fruit to fall off the trees. A warm and wet autumn will subject the fruit to the ravages of a maggot or worm, which eats its way into it. Fruit thus injured falls to the ground prematurely, and the oil made from it is of very bad quality, being nauseous in taste and somewhat thick and viscous. Frost following immediately on a fall of snow or sleet, when the trees are still wet, will irretrievably damage the fruit, causing it to shrivel up and greatly diminishing the yield of oil, while the oil itself has a dark color, and loses its delicate flavor.

The olive tree in Tuscany generally blossoms in April. By November the fruit has attained its full size, though not full maturity, and the olive harvest generally commences then. The fruit, generally speaking is

gathered as it falls to the ground, either from ripeness or in windy weather. In some districts, however, and when the crop is short, the practice is to strip the fruit from the trees early in the season. When there is a full crop the harvest lasts many months, and may not be finished till the end of May, as the fruit does not all ripen simultaneously. Oil made early in the season has a deeper color, and is distinguished by a fruity flavor, with a certain degree of pungency; while as the season advances it becomes lighter in color, thinner in body, and milder and sweeter in taste. Oil made towards the close of the harvest in April or May from extremely ripe fruit is of a very pale straw color, mild and sweet to the taste, though sometimes, if the fruit has remained too long on the trees, it may be slightly rancid. Oil very light in color is much prized in certain countries, notably France; and hence, if it also possesses good quality, commands a higher price in the Tuscan markets.

The fruit of the olive tree varies just as much in quality as does the grape, according to the species of the tree itself, the nature of the soil, exposure, and climate of the locality where it grows. Some varieties of the olive tree largely grown, because thought to be better suited to the special conditions of some districts, yield a fruit which imparts a bitter taste to the oil made from it; such oil, even when otherwise perfect, ranks as a second rate quality. The highest quality of oil can only be obtained when the fruit is perfectly and uniformly sound, well ripened, gathered as soon as it has dropped from the trees, and crushed immediately with great attention. Should the fruit remain any time on the ground, particularly during wet, weather, it deteriorates fast and gets an earthy taste; while if allowed remain an undue length of time in the garners it heats, begins to decompose, and will yield only bad oil.

The process of making oil is as follows: The fruit is crushed in a stone mill, generally moved by water power; the pulp is then put into bags made of fibre, and a certain number of these bags, piled one upon another, are placed in a press, most frequently worked by hand; when pressure is applied, the oil flows down into a channel by which it is conveyed to a receptacle or tank. When oil ceases to flow, tepid water is poured upon the bags to carry off oil retained by the bags. The pulp is then removed from the bags, ground again in the mill, then replaced

in the bags and pressed a second time. The water used in the process of making oil must be quite pure; the mill, press, bags and vessels sweet and clean, as the least taint would ruin the quality of the oil produced. The oil which has collected in the tank or receptacle just mentioned is removed day by day, and the water also drained off, as oil would suffer in quality if left in contact with water; the water also, which necessarily contains some oil mingled with it, is sent to a deposit outside, and at some distance from the crushing house, which is called the "Inferno," where it is allowed to accumulate, and the oil which comes to the surface is skimmed off from time to time. It is fit only for manufacturing purposes. After the second pressing the olive pulp is not yet done with; it is beaten up with water by mechanical agitators moved by water power, and then the whole discharged into open-air tanks adjoining the crushing-house. There the crushed olive kernels sink to the bottom, are gathered up and sold for fuel, fetching about 2 francs per 1,000 kilos., while the debris of the pulp is skimmed off the surface of the tank and again pressed in bags, yielding a considerable quantity of inferior oil, called "Olio lavato," or washed oil, which, if freshly made, is even used for food by the poorer classes. The pulp then remaining has still a further use. It is sold for treatment in factories by the sulphide of carbon process, and by this method yields from 7 to 9 per cent. of oil; of course suitable only for manufacturing purposes. Only the first two pressings yield oil which ranks as first quality, subject of course to the condition of the fruit being unexceptionable. New oil is allowed to rest awhile in order to get rid of sediment; it is then clarified by passing through clean cotton wool, when it is fit for use.

The highest quality of olive oil for eating purposes should not only be free from the least taint in taste or smell, but possessed of a delicate appetizing flavor. When so many favorable conditions are needed as to growth, maturity and soundness of the fruit, coupled with great attention during the process of oil making, it is not to be wondered at that by no means all or even the greater part of the oil produced in the most favored districts of Tuscany is of the highest quality. On the contrary, the bulk is inferior and defective. These defective oils are largely dealt in, both for home consumption and export, when price and not quality is the object.

In foreign countries there is always a market for inferior defective olive oil for cooking purposes, etc., provided the price be low. Price and not quality is the object, so much so that when olive oil is dear, cotton-seed, ground-nut and other oils are substituted, which bear the same relation to good olive oil that butterin and similar preparations do to real butter.

The very choicest qualities of pure olive oil are largely shipped from Leghorn to England along with the very lowest qualities, often also adulterated.

The oil put into Florence flasks is of the latter kind. Many years back this was not the case, but now it is a recognized fact that nothing but the lowest quality of oil is put into these flasks; oil utterly unfit for food, and so bad that it is a mystery to what use it is applied in England. Importers in England of oil in these flasks care nothing, however, about quality; cheapness is the only desideratum.

The best quality of Tuscan olive oil is imported in London in casks, bottled there, and bears the name of the importers alone on the label. There is no difficulty in procuring in England the best Tuscan oil, which nothing produced elsewhere can surpass; but consumers who wish to get, and are willing to pay for the best article, must look to the name and reputation of the importers and the general excellence of all the articles they sell, which is the best guarantee they can have of quality.—*Phar. Jour. and Trans.*, May 17, 1884, p. 923.

Olea europaea

Olive

Useful references: 248, 317

A tree cultivated for its fruit, from which an edible oil can be extracted. There are numerous varieties with fruits varying from round to oval and from 1 to 3 cm in diameter. Under the thin skin is the fleshy mesocarp containing the oil and in the centre a black hard nut with a kernel.

The fruits can be processed in several ways, each producing a different type of oilcake. Most commonly the whole fruits are crushed and pressed, first under low pressure and after that in another press under greater pressure, to produce a very hard cake consisting of kernels, broken kernels and pulp with a water content of 20-25% and a residual oil content of 8-16%. The cake is sometimes used as animal feed or is processed further by three methods. (1) The whole cake is solvent extracted. (2) The cake is recrushed, extracted with hot water and pressed. (3) The kernels and the pulp are separated either in a specially designed classifier or by flotation in water. The kernels, being heavier, sink to the bottom, while the pulp remains afloat. The floating pulp is 20-25% oil and can be used directly as livestock feed or can be further extracted. The kernels contain so little oil that they are discarded. If separated in a classifier, the skins (epicarp) can be collected separately from the kernels and the pulp.

Another method (the Acapulco method) separates the fruits into kernels and pulp, and the oil is pressed out of the pulp between rubber discs.

USE. Because of the rather low price at which the press cake is sold to factories for further oil extraction, there have been several investigations to assess its value in animal feeding. As the cake turns rancid rather quickly and may become completely unpalatable and even harmful to animals, it must be preserved either by drying or ensiling. Press cake containing kernels has a very low feed value and causes digestive troubles, especially in cattle. Therefore, the cake should be separated into kernels and pulp. The kernels can then be used as fuel to dry the pulp. The main value or the pulp as an animal feed is its high fat content. Owing to a peculiarity of the pulp, its protein is very low in digestibility. Contrary to what might be expected, the high oil content of the pulp has no adverse effect on the fat composition of the carcass. Up to 50% of the ruminant ration can consist of destoned press cakes and up to 15% does not decrease the digestibility of the ration. Calves can be fed 1-2 kg daily, fattening swine 0.8-1.5 kg and sheep 0.2-0.3 kg. Olive cakes extracted with solvents have less feed value because of their lower fat content. (The feed value of olive cakes is comparable to that of wheat straw.) The factor causing the decrease in digestibility seems to be soluble in tetrachloroethylene, as oilcakes extracted with this and subjected to alkaline hydrolysis showed no reduction in digestibility. Oilcakes so processed are comparable to good forage in feed value.

The destoned cake has also been used in feeding pigs in proportions up to 50% of a daily ration consisting of maize, wheat pollards and coconut cake. No digestive trouble or decrease in appetite was observed, and the rate of increase in liveweight was normal; however, the feed efficiency tended to be somewhat lower. Cakes should not be fed to pregnant animals as the birth weight tends to be lower. The cake has a rather low palatability.

Olive kernels are of no value as animal feed.

	As % of dry matter							
	DM	CP	CF	Ash	EE	NFE	Ca	P	Ref
Kernels, Italy		1.2	74.1	1.2	0.8	22.7			332
Skins, Italy	89.2	13.2	28.3	7.9	14.9	35.7			"
Press cake (kernels and pulp), Israel	85.2	6.3	40.0	4.2	11.9	37.6			365
Press cake (pulp only), Italy		10.5	32.5	6.8	14.5	35.7			332
Pulp, solvent extracted, Cyprus	93.3	10.5	34.8	4.7	2.8	47.2	0.33	0.12	369
Acapulco pulp, Italy	60.7	8.4	15.8	8.8	33.3	33.7			332

		Digestibility (%)					
	Animal	CP	CF	EE	NFE	ME	Ref
Skins	Cattle	32.8	37.7	76.8	38.1	1.95	332
Pulp	Cattle	17.0	35.0	85.0	32.0	1.85	"
Pulp, solvent extracted	Sheep	14.0	17.9	60.9	29.1	0.92	"
Acupulco pulp	Cattle	21.6	0.0	85.6	38.7	2.76	"
Kernels and pulp	Sheep	0.0	0.0	86.0	20.0	1.06	365

		Nylon bag degradability					
		a (%)	b (%)	c (/hour)	12hr (%)	48hr (%)	Ref
Olive kernel meal (CP 7.1)	DM	5.9	36.7	0.0264	15.9	32.3	629
	N	14.2	45.1	0.0612	37.7	56.9	"

[P (rumen degradability at time t) = a+b*(1-exp(-c*t))]

References

248, 317, 332, 365, 369, 629

Abstracts

Sheep(593)

Encyclopedia

olive oil

Definition: Pressing tree-ripened olives extracts a flavorful, monounsaturated oil that is prized throughout the world both for cooking (particularly in Mediterranean countries) and for salads. Today's marketplace provides a wide selection of domestic olive oil (most of which comes from California) and imported oils from France, Greece, Italy and Spain. The flavor, color and fragrance of olive oils can vary dramatically depending on distinctions such as growing region and the crop's condition. All olive oils are graded in accordance with the degree of acidity they contain. The best are **cold-pressed**, a chemical-free process that involves only pressure, which produces a natural level of low acidity. **Extra virgin olive oil**, the cold-pressed result of the first pressing of the olives, is only 1 percent acid. It's considered the finest and fruitiest of the olive oils and is therefore also the most expensive. Extra virgin olive oil can range from a crystalline champagne color to greenish-golden to bright green. In general, the deeper the color, the more intense the olive flavor. After extra virgin, olive oils are classified in order of ascending acidity. **Virgin olive oil** is also a first-press oil, with a slightly higher level of acidity of between 1 and 3 percent. **Fino olive oil** is a blend of extra virgin and virgin oils (*fino* is Italian for "fine"). Products labeled simply **olive oil** (once called *pure olive oil*) contain a combination of refined olive oil and virgin or extra virgin oil. The new **light olive oil** contains the same amount of beneficial monounsaturated fat as regular olive oil...and it also has exactly the

oleomargarine
olivada
olive
olive oil
Olympia
oyster
Omega-3 oils
Pacific
littleneck clam

COOKING

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same number of calories. What the term "light" refers to is that--because of an extremely fine filtration process--this olive oil is lighter in both color and fragrance, and has little of the classic olive-oil flavor. It's this rather nondescript flavor that makes "light" olive oil perfect for baking and cooking where regular olive oil's obvious essence might be undesirable. The filtration process for this light-style oil also gives it a higher smoke point than regular olive oil. Light olive oils can therefore be used for high-heat frying, whereas regular olive oil is better suited for low- to medium-heat cooking, as well as for many uncooked foods such as salad dressings and marinades. The International Olive Oil Institute recommends using pure olive oil for frying, since the flavor of extra virgin olive oil tends to break down at frying temperatures, making the added expense a waste. Olive oil should be stored in a cool, dark place for up to 6 months. It can be refrigerated, in which case it will last up to a year. Chilled olive oil becomes cloudy and too thick to pour. However, it will clear and become liquid again when brought to room temperature. *See also* fats and oils.

New Search?

A B C D E F G H I J
K L M N O P Q R S T
U V W X Y Z

Go

[x] Sectors

To Establish a European Network to Co-ordinate Information Exchange Between National Biomass Energy Programmes on Agricultural and Forestry Biomass

Phase I Final Report - December 1995

SECTOR REPORTS

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ANNEX A6 : Agricultural Residues

Sector Report on Agricultural Residues by DEA

Contents:

The Biomass Resources

The principal dry agricultural crop residue is straw. Besides straw, dry agricultural residues consist of cotton stalk, sunflower husk, rice husk, flax, hemp shives, olive kernels and wine

prunings etc. Cotton stalk, rice husk, sunflower husk, flax and hemp are very limited and are therefore not covered by this presentation. Olive kernels and wine prunings are considered to be covered by the report on arboricultural residues.

Wet agricultural residues are animal slurries from cattle and pigs. These slurries can be converted to heat and power by anaerobic digestion. These residues are not considered to be under the AFB-nett.

Chicken litter is in between dry and wet residues. In some countries, as for example the UK, it is considered to be an energy resource which can be burnt, but in other countries, e.g Denmark and Austria, burning is not considered due to its high nitrogen content. In Denmark it is either used as fertilizer directly on the field, or used in one of the 14 existing large scale biogas plants. Chicken litter is not included in this paper.

Green agricultural residues arise mainly from the processing of root vegetables and sugar beets. These residues are normally left in the fields for later ploughing in, and are not included in this paper.

Summary

The principal dry agricultural crop residue is straw. Besides straw, dry agricultural residues consist of cotton stalk, sunflower husk, rice husk, flax, hemp shives, olive kernels and wine prunings etc. Cotton stalk, rice husk, sunflower husk, flax and hemp are very limited and are therefore not covered by this presentation. Olive kernels and wine prunings are considered to be covered by the report on arboricultural residues.

Straw is considered to be a difficult type of fuel. It is relatively difficult to handle and to feed into the burner. It has a high content of volatile gasses, which makes special demands for the combustion chamber. It contains a high level of chlorine and alkaline compounds, which can cause corrosion problem, particularly with high steam temperatures. Further the ashes have a relatively low melting point, which can lead to slagging problems

ANNEX A7 : Arboricultural and Forestry Residues

Sector Report on Arboricultural and Forestry Residues by CBE

Introduction

Forest Residues. Forest is a very important potential and present supplier of biomass fuel both from forest operations and from forest based industries. The cleaning of forests, thinning, first cuts and final cutting operations, are normal sources of potentially usable residues. The removal of most of these residues, that can be economically used as alternative renewable fuels, can be of importance in terms of prevention of fires, relevant for southern countries, or at least, in the reduction of importance of forest fires, and in the reduction of plagues. In general terms we can consider two types of forest residues: forest residues resulting from operations performed to improve quality of wood production: - thinning, etc. - tops and branches - whole-tree chips forest residues resulting from final harvesting: only the stem is of normal economic interest -including tops, branches, bark- which are left in the forest

presses, grinders, decanters, etc. visit the Olive Oil Source website - look under Facts, then Olive Mills and Presses explained.

Pits or no Pits - What Makes the Best Oil?

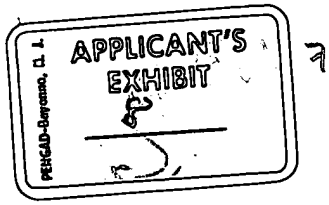
By Oliver Spits

Several olive oil machine manufacturers at SOL, the annual olive show this April in Verona, Italy were touting "pitless processing" for a better tasting oil and a longer shelf life. Pitters are not a new invention and for years some mills have sent their olives through a pitter before sending to a conventional olive oil system to avoid clogging the centrifugal decanter. But does pitless oil taste better? I interviewed Roberto Crea of CreAgri in Hayward, Ca. Dr. Crea, a native of Calabria, Italy, recently retired from Genentech where he was one of the founding

scientists. Now he spends his time searching for a better olive oil. He has spent several years developing a machine which does not break the pit when extracting the oil and sells the olive oil under the Supremo label. He explained that the pit contains compounds which can impart a bitter taste to the oil. The pit is also equipped with enzymes to digest oil for its growth. When the pit is crushed and the paste mixed, these enzymes are released, degrading and oxidizing the oil, increasing rancidity and shortening shelf life. Salespersons at SOL also claimed that the pits can soak up oil and decrease yield.

Paul Vossen, our farm bureau expert on olive oil, was not so enthusiastic. During tastings sponsored by the COOC, "pitless" oils were not necessarily given higher grades. Paul added, "This type of technology needs to be evaluated for at least 5 years. The ones really talking the pitted fruit

thing up are those who bought the systems and those selling the systems." Manufacturers of machines using hydraulic presses say that the pits are good, acting as conduits for the oil which increases yields when pressing. When I asked the Alfa Laval sales people about the pit issue they told me that their machines crush the pits to extract the oil in the pit, thereby increasing yield. They stated that the pits contain compounds which increase shelf life and prevent oxidation! Who to believe? I think Paul is right - only time will tell.



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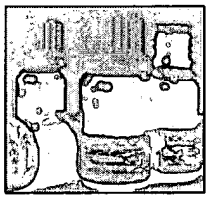


Index of essential oils

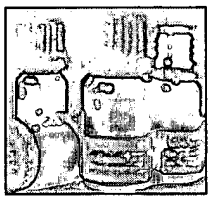
Index of massage carrier oils

Using essential oils in other ways

Using essential oils to help treat ailments

Olive oil (Olea europaea) as a massage

Olive oil has a strong, "foodsy" smell, but also has properties, soothing and healing the skin, especially



It is a very stable oil and does not go rancid ea stored without refrigeration for a year.

The oil is made from the pulp and not the kern qualities are available and range from extra virgin, Extra virgin is obtained from the first pressing, while from the second pressing and is normally lighter ir aromatic.

It contains good levels of essential fatty acids, alp and when taken internally is said to assist with heart

Applied externally it is useful for dehydrated, soı skin and is also used as a remedy for arthritis when affected parts.

We personally do not prefer to use Olive oil in since we find the oil a bit too heavy and t overpowering, but you could add Olive oil to massaging a mature or dry skin.

A typical chemical analysis of Olive oil looks like

Fatty acids		Range
Palmitic	C16:0	5.0 - 12.
Palmitoleic	C16:1	1.0 %
Stearic	C18:0	3.5 %
Oleic	C18:1	65.0 - 80.
Linoleic	C18:2	6.0 - 25.

Safety measures

Dilutions

Extraction methods

Why essential oils?

Other information pages related to essential oils

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Fax order form

Linolenic	C18:3	1.0 %
Arachidic	C20:0	0.6 %
Gadoleic	C20:1	0.5 %
Behenic	C22:0	0.3 %
Erucic	C22:1	0.2 %

Recommended list of carrier oils

Underneath is a list of other carrier oils used aromatherapy, which we recommend and sell: (The ones are marked with *)

Almond oil (Sweet) *
Aloe vera oil *
Apricot kernel oil *
Avocado oil *
Calendula oil *
Evening primrose oil *
Grapeseed oil *
Hazelnut oil *
Jojoba oil *
Macadamia oil *
Olive oil
Pumpkin seed oil
Rosehip oil
Safflower oil
Sesame oil *
Sunflower oil
Walnut oil
Wheatgerm oil *

Other pages that may be of interest:

Safety with essential oils
Essential Oil Index
Carrier oils
Dilutions when working with essential oils
Therapeutic properties of essential oils.
Treatments with essential oils

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